Ideas for using Big-BOSS Spectroscopy to Improve Science with LSST Supernova

R.Kessler
University of Chicago
(on behalf of the LSST SNWG)

November 18, 2009

1 Motivation for Taking SN Spectra

1. Since most LSST-SN will be identified *photometrically*, we will need a spectroscopically identified subset of SNe to study contamination from non-Ia (II, Ib, Ibc).
2. Since most SN redshifts will be determined *photometrically*, we will need spectroscopic redshifts for a subset of host-galaxies (and/or SNe) to study the photo-z precision and bias.

Scheduling note:
item #1 has a $\sim$ week time constraint while the SN is bright.
item #2 has no time constraint for the host galaxy.

2 Straw Plan

Special runs using *all* fibers to target SN host-galaxies in the DEEP fields: few thousand targets per year.

Use a few dozen BigBOSS fibers each night for the MAIN (wide) survey to

1. take spectrum of a handful of SNe near peak brightness
2. get spectroscopic redshift for handful of host-galaxies in which the SN has faded. Although this could be done later in special runs, take advantage of large area BigBOSS coverage to get subset over large area.

3 Spectroscopic Selection Bias

Spectroscopic SN samples in current surveys (SDSS,SNLS) have very high Ia-purity ($\sim 90\%$):
$\longrightarrow$ good for maximizing spectroscopically-confirmed samples
$\longrightarrow$ not so good to study contamination in photometrically identified SN samples.

To study non-Ia contamination in LSST, we prefer an unbiased SN trigger for spectroscopic identification.

4 Current Spectroscopic Follow-up Programs

Current spectroscopic programs will lead to a better understanding on optimizing the use of BigBOSS for LSST-SN science:

- littleBOSS (SDSS-3) is currently targeting a few thousand host-galaxies for SN candidates discovered during the SDSS-II supernova survey
- SNLS is currently targeting SN host-galaxies with VIMOS.